

**LYs Doc**

# 1 Introduction

## Why a MusicXML test suite?

This test suite of sample MusicXML (<http://www.musicxml.org/>) files is supposed to fill a severe gap for all developers implementing MusicXML support in their application: There is no complete test suite of MusicXML files available for testing purposes.

## Downloading the test suite

The complete set of MusicXML test files contained in this suite can be downloaded here ([MusicXML-TestSuite-0.1.zip](#)) as a ZIP archive.

## License of the test suite

This collection of MusicXML test files is distributed under the MIT license (<http://www.opensource.org/licenses/mit-license.php>), which means that you can use the files for any purpose, as long as you leave the copyright notice (or the LICENSE file) intact.

## Connection with LilyPond (<https://lilypond.org/>)

At the same time as providing a generic test suite for MusicXML document, this test suite also serves as proofs for the `musicxml2ly` script provided with LilyPond dev. The images shown in the Chapter 2 [Test cases], page 4, chapter were generated by running `musicxml2ly` and `lilypond` on the MusicXML files. As `musicxml2ly` does not yet perfectly support every single aspect of MusicXML, the output is not supposed to be used as a definitive reference rendering, but rather as an indication how one particular application supports and interprets each of the test files.

If something does not seem right in the output, it might either be that this feature has not been implemented yet, has been wrongly implemented, or a regression has crept in recently...

In the web version of this document, you can click on the file name or figure for each example to see the corresponding `.ly` intermediary file.

## Structure of this test suite

Each test file (typically hand-crafted from the MusicXML "specification") checks one particular aspect of MusicXML. A short description of the particular feature for a file is given element inside the file in a comment element of the form:

```
<identification><miscellaneous>
  <miscellaneous-field name="description"> .... </miscellaneous-field>
</miscellaneous></identification>
```

The files are categorized by their first two digits with the following meaning:

- 01-03 ... Basics: Pitches, Rests, Rhythm
- 11-13 ... Staff attributes: Time signatures, Clefs, Key signatures
- 21-24 ... Note settings: Chorded notes, note heads, tuplets, grace notes
- 31-33 ... Notations and articulations: Dynamics (staff-attached), Notations (note-attached), Spanners
- 41-44 ... Parts: Multiple parts, multi-voice parts, multi-staff parts
- 45-46 ... Measure issues and repeats
- 51-52 ... Page issues: Header fields, page layout
- 55-59 ... Exact positioning of items, offsets, etc.

- 61-69 ... Vocal music
- 71-75 ... Instrument-specific: Guitar (Chord, fretboards), Transposing instruments, Percussion, Figured Bass, Others
- 81-89 ... MIDI generation (all sound-related issues)
- 90-99 ... Various Other: Compressed MusicXML files, compatibility with broken MusicXML files exported by other applications

Some of the categories (in particular the exact item positioning and the MIDI generation) don't have any test cases yet.

## 2 Test cases

### 01 ... Pitches

All pitches from G to c'' in ascending steps; First without accidentals, then with a sharp and then with a flat accidental. Double alterations and cautionary accidentals are tested at the end.

01a-Pitches-Pitches.xml

### Pitches and accidentals

The musical score consists of four staves of music in treble clef, 4/4 time. The first staff starts with a common time signature 'C' and shows a sequence of notes ascending from G4 to c''5. The second staff starts at measure 8 and continues the sequence with various accidentals (sharps and flats) and double alterations. The third staff starts at measure 14 and continues the sequence with cautionary accidentals. The fourth staff starts at measure 20 and continues the sequence, ending with a double bar line.

All pitch intervals in ascending jump size.

01b-Pitches-Intervals.xml

### Various pitches and interval sizes

The musical score consists of two staves of music in treble clef, 2/4 time. The first staff starts with a 2/4 time signature and shows a sequence of notes with various interval sizes and accidentals. The second staff starts at measure 11 and continues the sequence with various interval sizes and accidentals.

The <voice> element of notes is optional in MusicXML (although Dolet always writes it out). Here, there is one note with lyrics, but without a voice assigned. It should still be correctly converted.

01c-Pitches-NoVoiceElement.xml

1. A

Some microtones: c flat-and-a-half, d half-flat, e half-sharp, f sharp-and-a half. Once in the lower and once in the upper region of the staff.

01d-Pitches-Microtones.xml

Accidentals can be cautionary or editorial. Each measure has a normal accidental, an editorial, a cautionary and an editorial and cautionary accidental.

01e-Pitches-ParenthesizedAccidentals.xml

Microtone accidentals can be cautionary or editorial. Each measure has a normal accidental, an editorial, a cautionary and an editorial and cautionary accidental.

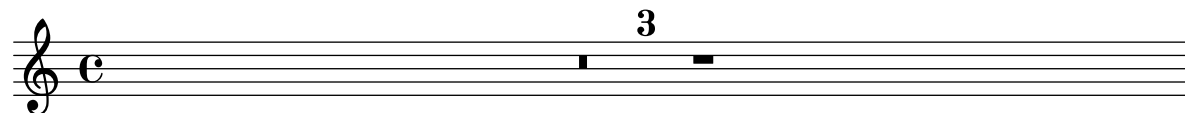
01f-Pitches-ParenthesizedMicrotoneAccidentals.xml

## 02 ... Rests

All different rest lengths: A two-bar multi-measure rest, a whole rest, a half, etc. until a 128th-rest; Then the same with dotted durations.

02a-Rests-Durations.xml

### Rest unit test



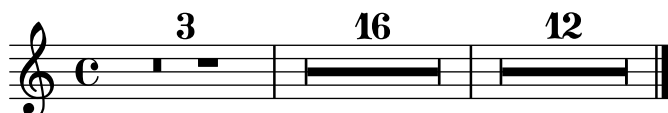
Rests can have explicit pitches, where they are displayed. The first rest uses no explicit position and should use the default position, all others are explicitly positioned somewhere else.

02b-Rests-PitchedRests.xml



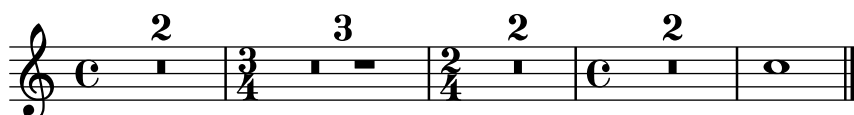
Four multi-measure rests: 3 measures, 15 measures, 1 measure, and 12 measures.

02c-Rests-MultiMeasureRests.xml



Multi-Measure rests should always be converted into durations that are a multiple of the time signature.

02d-Rests-Multimeasure-TimeSignatures.xml



In some cases, a rest might not have its type attribute set (this happens, for example, with voices in Finale, where you don't manually insert a rest).

02e-Rests-NoType.xml



### 03 ... Rhythm

All note durations, from long, brevis, whole until 128th; First with their plain values, then dotted and finally doubly-dotted.

03a-Rhythm-Durations.xml

The image shows three staves of musical notation in treble clef, 4/4 time. The first staff starts with a 16-measure rest, followed by a sequence of notes with durations of 16, 24, 32, 48, 64, 96, 128, 192, 288, and 432 measures. The second staff starts with a 3-measure rest, followed by notes with durations of 24, 36, 48, 72, 108, 162, 243, 364.5, 546.75, and 820.125 measures. The third staff starts with a 5-measure rest, followed by notes with durations of 28, 42, 56, 84, 126, 189, 283.5, 425.25, 637.875, and 956.8125 measures.

Two voices with a backup, that does not jump to the beginning for the measure for voice 2, but somewhere in the middle. Voice 2 thus won't have any notes or rests for the first beat of the measures.

03b-Rhythm-Backup.xml

The image shows a single staff of musical notation in treble clef, common time (C). It contains a single note on the second line of the staff, which is a quarter note with a backup symbol (a vertical line with a horizontal bar) indicating it starts in the middle of the measure.

Although uncommon, the divisions of a quarter note can change somewhere in the middle of a MusicXML file. Here, the first half measure uses a division of 1, which then changes to 8 in the middle of the first measure and to 38 in the middle of the second measure.

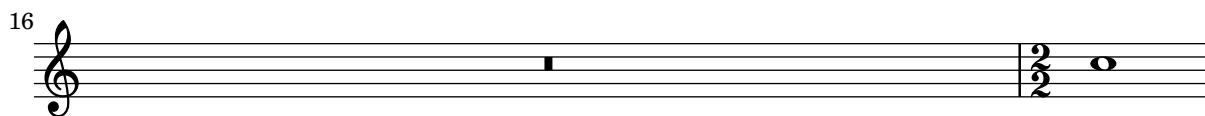
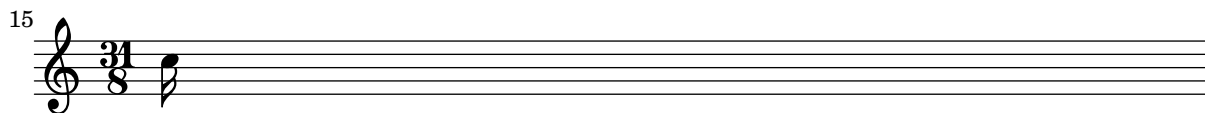
03c-Rhythm-DivisionChange.xml

The image shows a single staff of musical notation in treble clef, common time (C). It contains two measures of music. The first measure has four quarter notes, and the second measure has two quarter notes. The notation indicates a change in the division of a quarter note from 1 to 8 in the middle of the first measure and from 8 to 38 in the middle of the second measure.

Several durations can be written with dots. For multimeasure rests, we can also have durations that cannot be expressed with dotted notes (like 5/8).

03d-Rhythm-DottedDurations-Factors.xml

The image shows two staves of musical notation in treble clef. The first staff starts with a 1-measure rest, followed by a 2-measure rest, a 3-measure rest, a 4-measure rest, and a 5-measure rest. The second staff starts with a 5-measure rest, followed by a 7-measure rest, a 9-measure rest, and a 11-measure rest. The notation includes dotted notes and multimeasure rests with durations that cannot be expressed with dotted notes.



No divisions attribute

03e-Rhythm-No-Divisions.xml



## 11 ... Time signatures

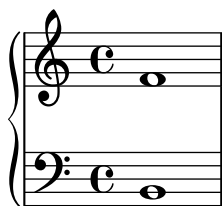
Various time signatures: 2/2 (alla breve), 4/4 (C), 2/2, 3/2, 2/4, 3/4, 4/4, 5/4, 3/8, 6/8, 12/8

11a-TimeSignatures.xml



A score without a time signature (but with a key and clefs)

11b-TimeSignatures-NoTime.xml



Compound time signatures with same denominator:  $(3+2)/8$  and  $(5+3+1)/4$ .

11c-TimeSignatures-CompoundSimple.xml



Compound time signatures with separate fractions displayed:  $3/8+2/8+3/4$  and  $5/2+1/8$ .

11d-TimeSignatures-CompoundMultiple.xml



Compound time signatures of mixed type:  $(3+2)/8+3/4$ .



11e-TimeSignatures-CompoundMixed.xml



A time signature of 3/8 with the symbol=" cut" attribute and two symbol="single-number" attributes with compound time signatures. Shall the symbol be ignored in this case?

11f-TimeSignatures-SymbolMeaning.xml



Time signature displayed as a single number.

11g-TimeSignatures-SingleNumber.xml



Senza-misura time signature

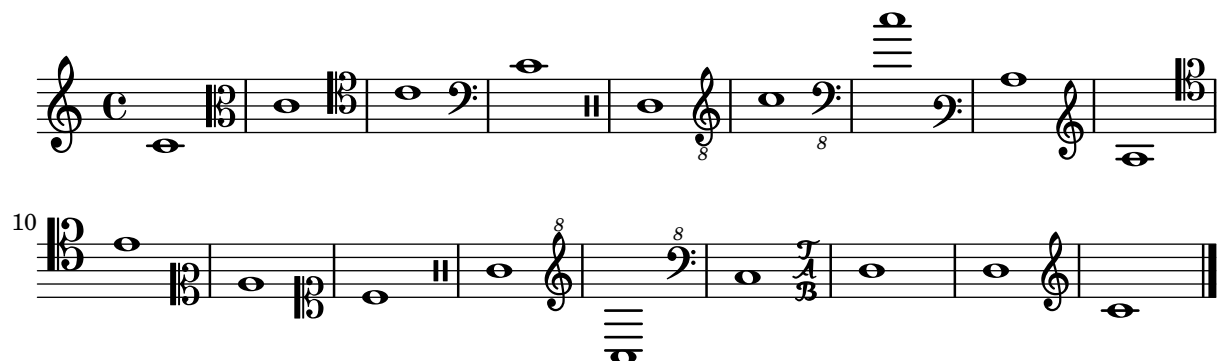
11h-TimeSignatures-SenzaMisura.xml



## 12 ... Clefs

Various clefs: G, C, F, percussion, TAB and none; some are also possible with transposition and on other staff lines than their default (e.g. soprano/alto/tenor/baritone C clefs); Each measure shows a different clef (measure 17 has the " none" clef), only measure 18 has the same treble clef as measure 1.

12a-Clefs.xml



A score without any key or clef defined. The default (4/4 in treble clef) should be used.

12b-Clefs-NoKeyOrClef.xml



### 13 ... Key signatures

Various key signature: from 11 flats to 11 sharps (each one first one measure in major, then one measure in minor)

13a-KeySignatures.xml

### Different Key signatures

The image displays 11 staves of musical notation, each representing a different key signature. The first seven staves (measures 1-37) show key signatures with 11 flats, 10 flats, 9 flats, 8 flats, 7 flats, 6 flats, and 5 flats. The last four staves (measures 37-42) show key signatures with 4 sharps, 5 sharps, 6 sharps, and 7 sharps. Each staff begins with a treble clef and a 2/4 time signature. The notation consists of quarter notes on a single pitch, with the key signature indicated by the number of flats or sharps at the beginning of the staff.

All different modes: major, minor, ionian, dorian, phrygian, lydian, mixolydian, aeolian, and locrian; All modes are given with 2 sharps.

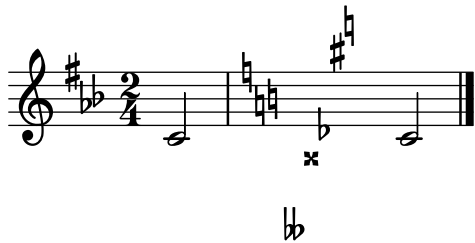
13b-KeySignatures-ChurchModes.xml

The image shows a single staff of musical notation for the first mode (major) with 2 sharps. The staff begins with a treble clef and a common time signature (C). The notation consists of quarter notes on a single pitch, with the key signature indicated by two sharps at the beginning of the staff.

1. major minor ionian dorian phrygian lydian mixolydian aeolian locrian

Non-traditional key signatures, where each alteration is separately given. Here we have (f sharp, a flat, b flat) and (c flatflat, g sharp sharp, d flat, b sharp, f natural), where in the second case an explicit octave is given for each alteration.

13c-KeySignatures-NonTraditional.xml



Non-traditional key signatures with microtone alterations: (g flat-and-a-half, a flat, b half-flat, c natural, d half-sharp, e sharp, f sharp-and-a-half).

13d-KeySignatures-Microtones.xml



## 14 ... Staff attributes

The number of staff lines can be modified by using the staff-lines child of the staff-details attribute. This can happen globally (the first staff has one line globally) or during the part at the beginning of a measure and even inside a measure (the second part has 5 lines initially, 4 at the beginning of the second measure, and 3 starting in the middle of the third measure).

14a-StaffDetails-LineChanges.xml



## 21 ... Chorded notes

One simple chord consisting of two notes.

21a-Chord-Basic.xml



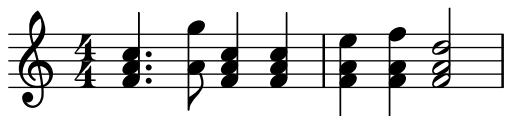
Some subsequent (identical) two-note chords.

21b-Chords-TwoNotes.xml



Some three-note chords, with various durations.

21c-Chords-ThreeNotesDuration.xml



Chords in the second measure, after several ornaments in the first measure and a p at the beginning of the second measure.

21d-Chords-SchubertStabatMater.xml



Check for proper chord detection after a pickup measure (i.e. the first beat of the measure is not aligned with multiples of the time signature)!

21e-Chords-PickupMeasures.xml



Between the individual notes of a chord there can be direction or harmony elements, which should be properly assigned to the chord (or the position of the chord).

21f-Chord-ElementInBetween.xml



## 22 ... Note settings, heads, etc.

Different note styles, using the <notehead> element. First, each note head style is printed with four quarter notes, two with filled heads, two with unfilled heads, where first the stem is up and then the stem is down. After that, each note head style is printed with a half note (should have an unfilled head by default). Finally, the Aiken note head styles are tested, once with stem up and once with stem down.

22a-Noteheads.xml



12

back slashed normal cluster none slash triangle diamond square

18

cross x circle-x inverted triangle arrow down arrow up slashed back slashed

22

normal cluster do re mi fa so

28

la ti do re mi fa so la ti do do re mi fa so la ti do

Staff-connected note styles: slash notation, hidden notes (with and without hidden staff lines)

22b-Staff-Notestyles.xml

1. slash, no stem slash, with stem normal settings restored

Different note styles for individual notes inside a chord, using the <notehead> element.

22c-Noteheads-Chords.xml

1. normal cross
2. triangle
3. slash

Parenthesized note heads. First, a single parenthesized note is tested, once with a normal and then with a non-standard notehead, then two chords with some/all parenthesized noteheads and finally a parenthesized rest.

22d-Parenthesized-Noteheads.xml





A grace note on a different staff than the actual note.

24e-GraceNote-StaffChange.xml



A grace note with a slur to the actual note. This can be interpreted as acciaccatura or appoggiatura, depending on the existence of a slash.

24f-GraceNote-Slur.xml



### 31 ... Dynamics and other single symbols

All <direction> elements defined in MusicXML. The lyrics for each note describes the direction element assigned to that note.

31a-Directions.xml

## MusicXML directions (attached to staff)

1. **A** **B** **Test** **Crc**  
 1. reh.A (def=sq.) reh.B (none) reh.Test (sq.) reh.Crc (crc.)

2. **Segno** **Coda** **Words** **Eyegl.** **p** **pp** **ppp** **pppp** **ppppp** **pppppp** **ppppppp** **f** **ff**  
 Segno Coda Words Eyegl. p pp ppp pppp ppppp pppppp f ff

5. **fff** **ffff** **mp** **mf** **sf** **sfp** **sfpp** **fp** **rf** **rfz** **sfz** **sfz** **fz** **abc-ffz**  
 fff ffff ffff fffff mp mf sf sfp sfpp fp rf rfz sfz sfz fz abc-ffz (oth.)



9 *tr*

hairpin cresc dash - es bra - cket oct. - shift *Red.* \* *Red.* \*

12 ♩ = 60

*p* subito *ppp* < *fff*

Metr. Harp ped. Damp Damp all Scord. Accordion reg. subpp ppp crescto fff

Tempo Markings: note=bpm, text (note=bpm), note=note, (note=note), (note=bpm)  
 31c-MetronomeMarks.xml

♩ = 100 Adagio (♩ = 100) (♩ = 77)

### 32 ... Notations and Articulations

All <notation> elements defined in MusicXML. The lyrics show the notation assigned to each note.

32a-Notations.xml

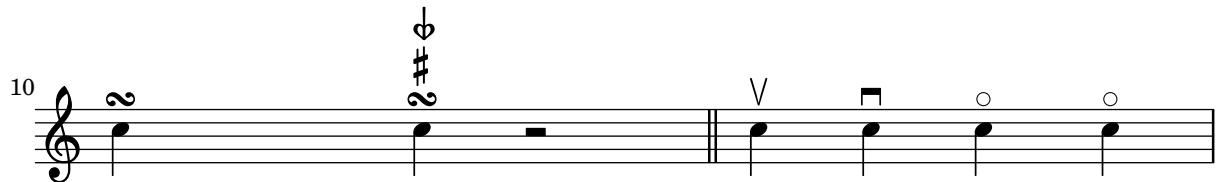
#### MusicXML notations (attached to note)

1. ferm. normal ferm. angled ferm. square ferm.

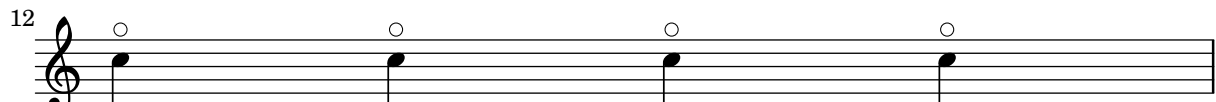
inv.ferm. arp. non-arp. acc.mark acc. str.-acc. stacc. ten.

det.-leg. stacc.ss spicc. scoop plop doit falloff breath caes. stress unstr.

tr. turn del.turn inv.turn shake wavywavyline mord. inv.mord. schl. trem.

10 

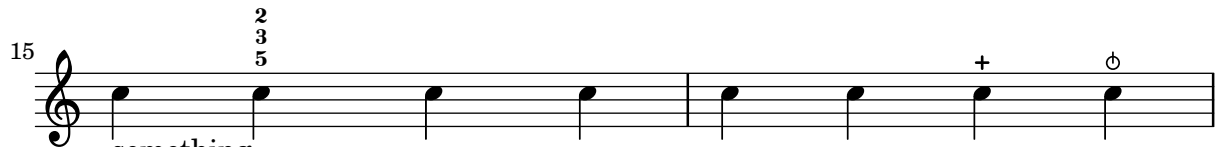
turn+acc. turn+acc.(ab.+bel./rel to turn) up-b. down-b. harm. nat.harm.

12 


art.harm. nat.h./base nat.h./touching nat.h./sounding

13 

open-str. thumb-pos. empty fing. fing.1 fing.2 fing.3 fing.4 fing.5

15 

something  
fing.sth. mult.fing. empty pluck pluck a dbl.tng. trpl.tng. stopped snp.pizz.

17 

empty fret fret0 empty str. str. 5 hammer - on pull - off

19 

bend b.3 with-bar pre-b. -0.5 b. release 3.5 tap tap T heel toe

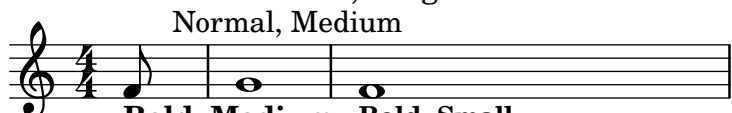
21 

fingern. f ppp sfp sfffz  
f ppp sfp Oth.dyn. both above ab./bel./bel.

Text markup: different font sizes, weights and colors.

32b-Articulations-Texts.xml

Normal, Small  
Normal, Large  
Normal, Medium



**Bold, Medium** **Bold, Small**  
**Bold, Large**  
Normal, Small, Colored, Below

It should not make any difference whether two articulations are given inside two different notation elements, inside two different articulations children of the same notation element or inside the same articulations element. Thus, all three notes should have a staccato and an accent.

32c-MultipleNotationChildren.xml



Different Arpeggio directions (normal, up, down, non-arpeggiate)

32d-Arpeggio.xml

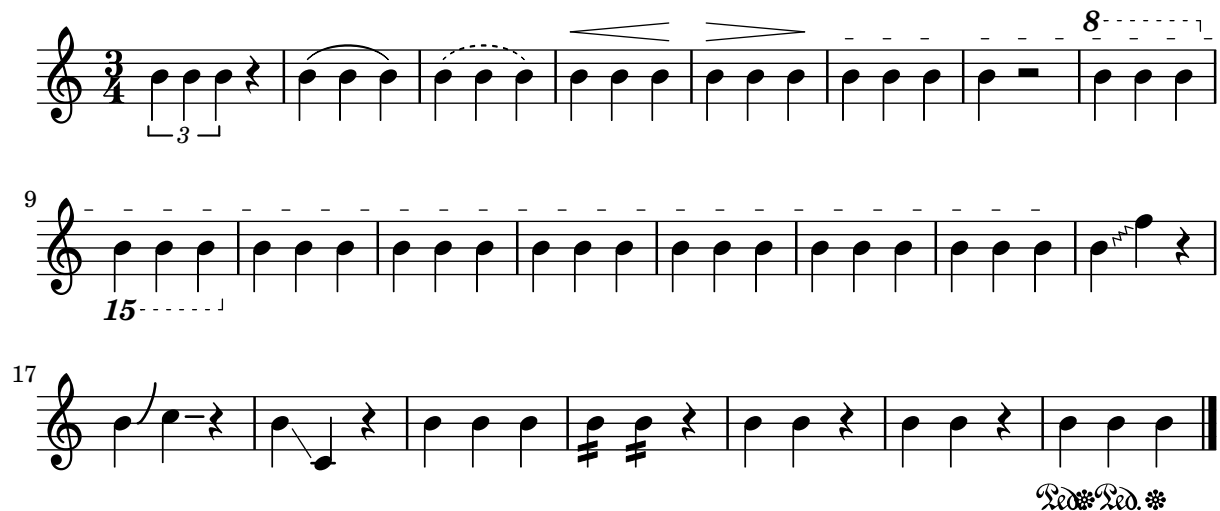


1. normal up normal down normal non-arp. normal

### 33 ... Spanners

Several spanners defined in MusicXML: tuplet, slur (solid, dashed), tie, wedge (cresc, dim), tr + wavy-line, single-note trill spanner, octave-shift (8va,15mb), bracket (solid down/down, dashed down/down, solid none/down, dashed none/up, solid none/none), dashes, glissando (wavy), bend-alter, slide (solid), grouping, two-note tremolo, hammer-on, pull-off, pedal (down, change, up).

33a-Spanners.xml



Two simple tied whole notes

33b-Spanners-Tie.xml



A note can be the end of one slur and the start of a new slur. Also, in MusicXML, nested slurs are possible like in the second measure where one slur goes over all four notes, and another slur goes from the second to the third note.

33c-Spanners-Slurs.xml



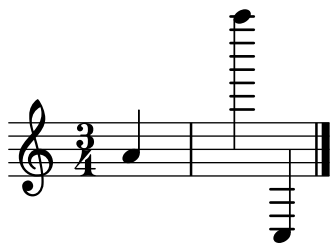
All types of octave shifts (15ma, 15mb, 8va, 8vb)

33d-Spanners-OctaveShifts.xml



Invalid octave-shifts: 27 down, 11 up.

33e-Spanners-OctaveShifts-InvalidSize.xml



A trill spanner that spans a grace note and ends on an after-grace note at the end of the measure.

33f-Trill-EndingOnGraceNote.xml



Slurs on chorded notes: Only the first note of the chord should get the slur notation. Some applications print out the slur for all notes – these should be ignored.

33g-Slur-ChordedNotes.xml



All different types of glissando defined in MusicXML

33h-Spanners-Glissando.xml



1. normal glissando solid (+text) dashed dotted wavy normal slide

4

solid (+text) dashed dotted wavy

A musical staff with a treble clef and a 4-measure piece. The first measure has a solid tie between two notes. The second measure has a dashed tie between two notes. The third measure has a dotted tie between two notes. The fourth measure has a wavy tie between two notes. Below the staff, the labels 'solid (+text) dashed dotted wavy' are aligned with their respective ties.

Several ties that have their end tag missing.

33i-Ties-NotEnded.xml

1. A B C D E

A musical staff with a treble clef and a common time signature. It contains five tied notes, each labeled with a letter: A, B, C, D, and E. The notes are connected by horizontal lines, indicating they are tied across measures.

## 41 ... Multiple parts (staves)

A piece with four parts (P0, P1, P2, P3; different from what Finale creates!). Are they converted in the correct order?

41a-MultiParts-Partorder.xml

Part 1  
Part 2  
Part 3  
Part 4

A musical score consisting of four staves, each labeled 'Part 1' through 'Part 4'. Each staff contains a single note with a stem and a flag, followed by a rest. The notes are in a G major key signature and a 4/4 time signature.

A piece with 20 parts to check whether an application supports that many parts and whether they are correctly sorted.

A huge orchestra score with 28 parts and different kinds of nested bracketed groups. Each part/group is assigned a name and an abbreviation to be shown before the staff. Also, most of the groups show unbroken barlines, while the barlines are broken between the groups.

The image shows a musical score for a symphony orchestra. The instruments are listed on the left, and their corresponding staves are on the right. The staves are grouped into two main sections: woodwinds and strings. The woodwind section includes Piccolo, Flute 1, Flute 2, Oboe, English Horn, Clarinet in Eb, Clarinet in Bb 1, Clarinet in Bb 2, Bass Clarinet, Bassoon 1, Bassoon 2, Contrabassoon, Horn in F 1, Horn in F 2, Trumpet in C 1, Trumpet in C 2, Trombone 1, Trombone 2, Tuba, Timpani, and Percussion. The string section includes Harp, Piano, Violin I, Violin II, Viola, Cello, and Contrabass. The score is written in a single system with a common time signature (C). The woodwind staves are grouped with a curly bracket on the left, and the string staves are grouped with a square bracket on the left. The woodwind group includes staves 2 through 4, and the string group includes staves 3 through 4.

Two properly nested part groups: One group (with a square bracket) goes from staff 2 to 4) and another group (with a curly bracket) goes from staff 3 to 4.

41d-StaffGroups-Nested.xml

A musical score consisting of five staves. The first staff is a single treble clef staff. The second, third, and fourth staves are grouped together by a large left-facing curly bracket on the left side. The fifth staff is a single treble clef staff. Each staff contains three measures of music in common time (C), with a whole note in the first measure, a half note in the second measure, and a whole rest in the third measure. The score ends with a double bar line.

Part names and abbreviations can contain line breaks.

41e-StaffGroups-InstrumentNames-Linebroken.xml

A musical staff with a treble clef and common time signature. The staff contains five measures, each with a whole note. To the left of the staff, the text "Long Staff Name" is written vertically, with a line extending from the "S" of "Staff" to the first measure of the staff.

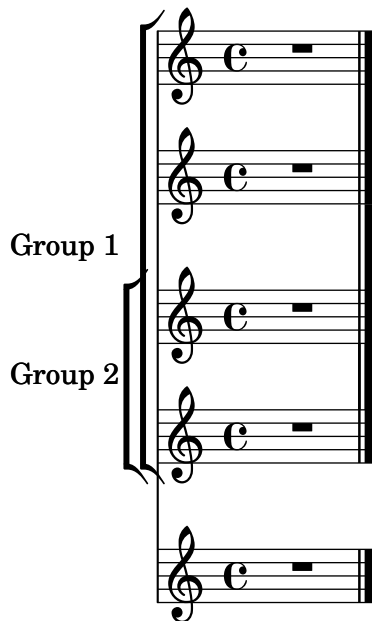
A musical staff with a treble clef and common time signature. The staff contains eight measures, each with a whole note. To the left of the staff, the text "6 St. Nm." is written vertically, with a line extending from the "S" of "St." to the first measure of the staff.

A musical staff with a treble clef and common time signature. The staff contains eight measures, each with a whole note, followed by a whole rest in the final measure. To the left of the staff, the text "15 St. Nm." is written vertically, with a line extending from the "S" of "St." to the first measure of the staff.

MusicXML allows for overlapping part-groups, while many applications do not allow overlapping groups, but require them to be properly nested. In this case, one group (within parenthesis) goes from staff 1 to 4 and another group (also within parenthesis) goes from staff 3 to 5.



41f-StaffGroups-Overlapping.xml



A musical score consisting of five staves. The first two staves are grouped together by a brace on the left and labeled "Group 1". The next two staves are grouped together by a brace on the left and labeled "Group 2". The fifth staff is not grouped. Each staff contains a treble clef, a common time signature (C), and a whole note (c) followed by a bar line.

A part with no id attribute. Since this piece has only one part, it is clear which part is described by the one part element.

41g-PartNoId.xml



A single musical staff with a treble clef, a common time signature (C), and a whole note (c) followed by a bar line.

This piece has more part elements than the part-list section gives. One can either convert all the parts present, but not listed in the part-list, or simply not import / ignore them.

41h-TooManyParts.xml

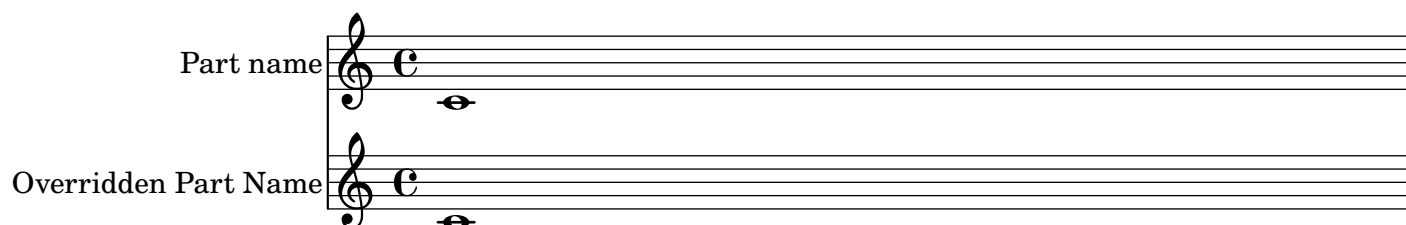


A single musical staff with a treble clef, a common time signature (C), and a whole note (c) followed by a bar line.

MusicXML allows part-name and part-name-display in the score-part element. If part-name-display is given, it overrides the part-name for display.

The first staff uses only part-name, while the second one (same part-name) overrides it with a custom text. Similar for the part-abbreviation used in subsequent staves.

41i-PartNameDisplay-Override.xml



A musical score consisting of two staves. The first staff is labeled "Part name" and the second staff is labeled "Overridden Part Name". Both staves have a treble clef, a common time signature (C), and a whole note (c) followed by a bar line.

This score has multiple display-text elements in its part-name-display block. This is handled without crashing.

41j-PartNameDisplay-Multiple-DisplayText-Children.xml

Player One

## 42 ... Multiple voices per staff

Two voices share one staff. Each voice is assigned some lyrics.

42a-MultiVoice-TwoVoicesOnStaff-Lyrics.xml

- 1. This is the lyrics of Voice1
- 1. This is the lyrics of Voice2

A multi-voice / multi-staff part with a clef change in the middle of a measure and a <backward> for voice 2 jumping back beyond that clef change.

42b-MultiVoice-MidMeasureClefChange.xml

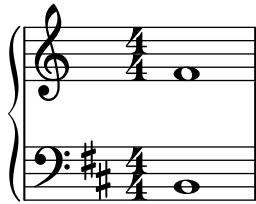
## 43 ... One part on multiple staves

A simple piano staff

43a-PianoStaff.xml

A piano staff with different keys and clefs for each of its staves. The keys and clefs for both staves are given at the very beginning of the measure.

43b-MultiStaff-DifferentKeys.xml



A piano staff with two staves. The first staff is in treble clef with a key signature of one sharp (F#) and a 4/4 time signature. The second staff is in bass clef with a key signature of two sharps (F# and C#) and a 4/4 time signature. Both staves contain a single whole note in the first measure.

A piano staff with different keys and clefs for each of its staves. The key and clef for the second staff is given only after a backward, just before the first note of the second staff is given, but after the whole measure for staff 1 has been given.

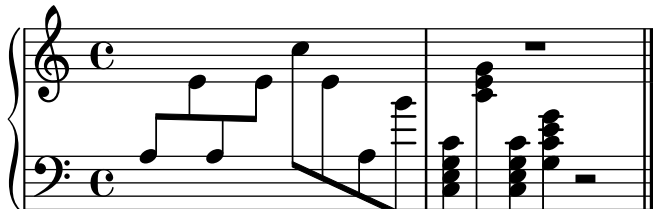
43c-MultiStaff-DifferentKeysAfterBackup.xml



A piano staff with two staves. The first staff is in treble clef with a key signature of one sharp (F#) and a 4/4 time signature. The second staff is in bass clef with a key signature of two sharps (F# and C#) and a 4/4 time signature. Both staves contain a single whole note in the first measure.

Staff changes in a piano staff. The voice from the second staff has some notes/chords on the first staff. The final two chords have some notes on the first, some on the second staff.

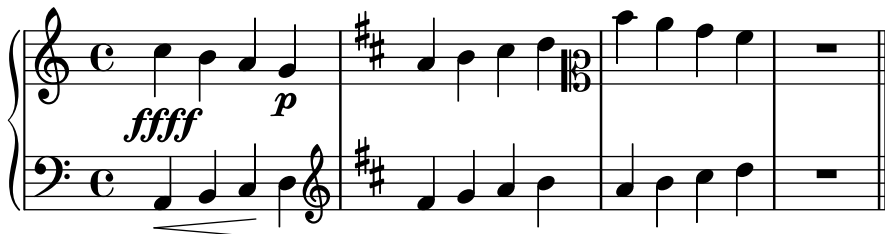
43d-MultiStaff-StaffChange.xml



A piano staff with two staves. The first staff is in treble clef with a common time signature (C). The second staff is in bass clef with a common time signature (C). The first staff contains a melodic line of eighth notes. The second staff contains a bass line of eighth notes. The piece ends with two chords, each with notes on both staves.

A piano staff with dynamics and clef changes, where each element (ffff, wedge and clef changes) applies only to one voice or one staff, respectively.

43e-Multistaff-ClefDynamics.xml

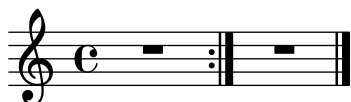


A piano staff with two staves. The first staff is in treble clef with a common time signature (C). The second staff is in bass clef with a common time signature (C). The first staff contains a melodic line of eighth notes. The second staff contains a bass line of eighth notes. The piece includes dynamics (ffff and p), a wedge, and a clef change in the second staff.

## 45 ... Repeats

A simple, repeated measure (repeated 5 times)

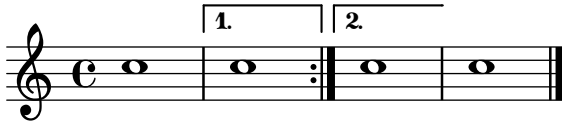
45a-SimpleRepeat.xml



A single staff in treble clef with a common time signature (C). The staff contains a single measure with a whole rest, followed by a repeat sign and another measure with a whole rest.

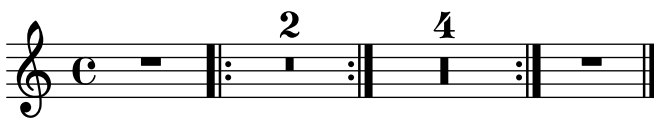
A simple repeat with two alternative endings (volta brackets).

45b-RepeatWithAlternatives.xml



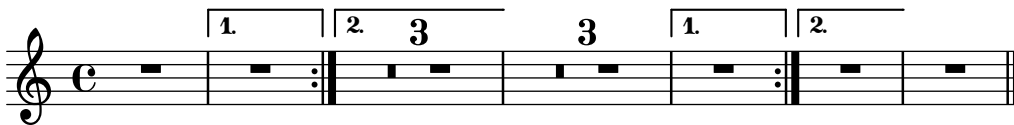
Repeats can also be nested.

45c-RepeatMultipleTimes.xml



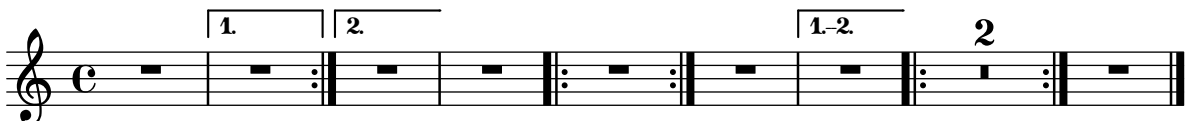
Nested repeats, each with alternative endings.

45d-Repeats-Nested-Alternatives.xml



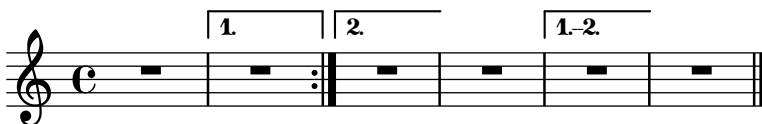
Some more nested repeats with alternatives. The barline between measure 7 and 8 will probably be messed up! (Should be a repeat on both sides!)

45e-Repeats-Nested-Alternatives.xml



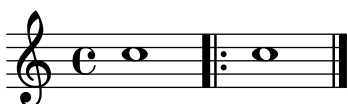
Some more nested repeats with alternatives, where the MusicXML file does not make sense in the first place. How well are applications able to cope with improper repeats and alternatives?

45f-Repeats-InvalidEndings.xml



A forward-repeating bar line without an ending repeat bar.

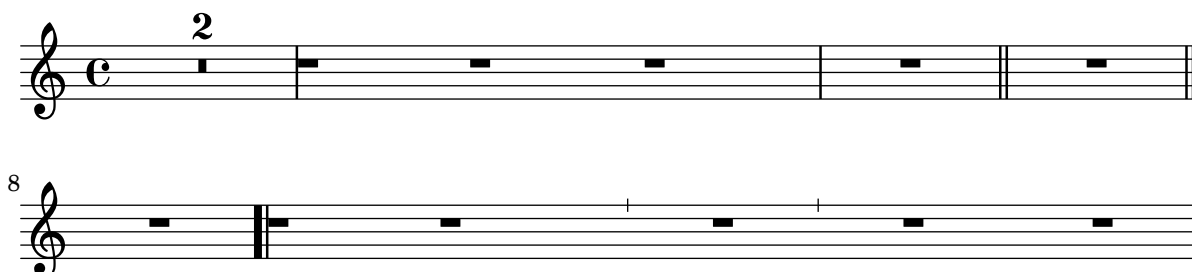
45g-Repeats-NotEnded.xml



## 46 ... Barlines, Measures

Different types of (non-repeat) barlines: default (no setting), regular, dotted, dashed, heavy, light-light, light-heavy, heavy-light, heavy-heavy, tick, short, none.

46a-Barlines.xml



Barlines can appear at mid-measure positions, without using an implicit measure!

46b-MidmeasureBarline.xml



A clef change in the middle of a measure, using either an implicit measure or simply placing the attributes in the middle of the measure.

46c-Midmeasure-Clef.xml



A 3/8 pickup measure, a measure that is split into one (incomplete, only 2/4) measure and an implicit measure, and an incomplete measure (containing 3/4).

46d-PickupMeasure-ImplicitMeasures.xml



Voice 2 should start at 2nd beat of first full measure.

46e-PickupMeasure-SecondVoiceStartsLater.xml



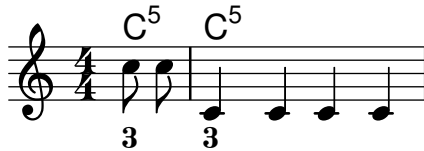
Measures can contain less notes than the time signature says. Here, the first and third measures contain only two quarters instead of four.

46f-IncompleteMeasures.xml



Pickup measure with chord names and figured bass.

46g-PickupMeasure-Chordnames-FiguredBass.xml



## 51 ... Header information

Several header fields and part names can contain quotes (" ). This test checks whether they are converted/imported without problems (i.e. whether they are correctly escaped when converting).

51b-Header-Quotes.xml

## " Quotes" in header fields

Some " Tester" Name



There can be multiple <rights> tags in the identification element of the score. The conversion shall still work, ideally using both of them.

51c-MultipleRights.xml



A piece with an empty (but existing) work-title, but a non-empty movement-title. In this case the movement-title should be chosen, even though the work-title exists.

51d-EmptyTitle.xml

## Empty work-title, non-empty movement-title

### Empty work-title, non-empty movement-title



## 52 ... Page layout

Several page layout settings: paper size, margins, system margins and distances, different fonts, etc.

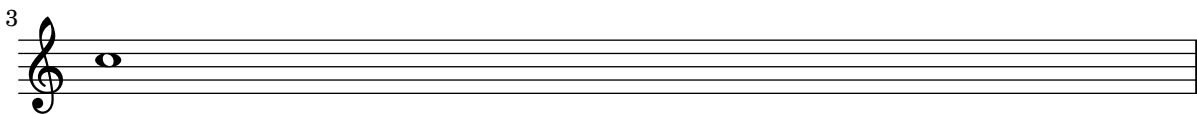
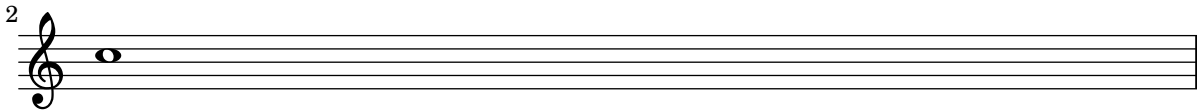
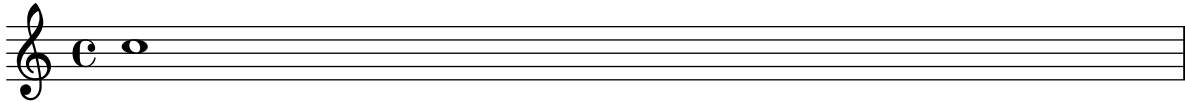
52a-PageLayout.xml

### Layout options





System and page breaks, given in a <print> element  
52b-Breaks.xml



## 61 ... Lyrics

Some notes with simple lyrics: Syllables, notes without a syllable, syllable spanners.

61a-Lyrics.xml



1. Trala-li Ja! Tra - ra! Bah!

Multiple (simple) lyrics. The order of the exported stanzas is relevant (identified by the number attribute in this test case)

61b-MultipleLyrics.xml



1. 1.Tra-la-la, ja! — Tra - ra...
2. 2.tra - la-la, ja! — Tra - ra.
3. 3.TRALALA, JA! — TRA-RA...

Lyrics assigned to the voices of a piano staff containing two simple staves. Each staff is assigned exactly one lyrics line.

61c-Lyrics-Pianostaff.xml



1. TRALALIJA! \_

How to treat lyrics and slurred notes. Normally, a slurred group of notes is assigned only one lyrics syllable.

61d-Lyrics-Melisma.xml



1. Me - lis - ma. \_

The image shows a musical staff in treble clef with a common time signature (C). It contains four measures of music. The first measure has a quarter note G4 with a slur over it. The second measure has a quarter note A4 with a slur over it. The third measure has a quarter note B4 with a slur over it. The fourth measure has a quarter note C5 with a slur over it. The lyrics "1. Me - lis - ma. \_" are written below the staff, with hyphens under "Me" and "lis", and a period under "ma".

Assigning lyrics to chorded notes.

61e-Lyrics-Chords.xml



1. Lyrics on chords

The image shows a musical staff in treble clef with a common time signature (C). It contains four measures of music. The first measure has a quarter note G4. The second measure has a quarter note A4. The third measure has a quarter note B4. The fourth measure has a quarter note C5. The lyrics "1. Lyrics on chords" are written below the staff.

Grace notes shall not mess up the lyrics, and they shall not be assigned a syllable.

61f-Lyrics-GracedNotes.xml



1. Ly - rics on notes \_

The image shows a musical staff in treble clef with a common time signature (C). It contains four measures of music. The first measure has a quarter note G4. The second measure has a quarter note A4 with a grace note G4. The third measure has a quarter note B4 with a grace note A4. The fourth measure has a quarter note C5 with a grace note B4. The lyrics "1. Ly - rics on notes \_" are written below the staff, with hyphens under "Ly" and "rics".

A lyrics syllable can have both a number and a name attribute. The question is: What should be used to put syllables of the same voice together. This example uses different number/name combinations to check how different applications handle this unspecified case (The advice on the MusicXML mailing list was "there is no correct way, each application can do what it thinks is best").

61g-Lyrics-NameNumber.xml



1. Verse1AChorus1AAnotherChorus1A1BVerse1CChorus1D  
2. Chorus1A - 2B - Chorus2C

The image shows a musical staff in treble clef with a 6/4 time signature. It contains six measures of music, each with a quarter note G4. The lyrics "1. Verse1AChorus1AAnotherChorus1A1BVerse1CChorus1D" and "2. Chorus1A - 2B - Chorus2C" are written below the staff.

Beaming or slurs can indicate melismata for lyrics. Also make sure that notes without an explicit syllable are treated as if they were part of a melisma.

61h-Lyrics-BeamsMelismata.xml



1. Me - lisma \_ Me - lisma \_ Me - lisma \_ Me - lisma \_

The image shows a musical staff in treble clef with a common time signature (C). It contains four measures of music. The first measure has a quarter note G4. The second measure has a quarter note A4. The third measure has a quarter note B4. The fourth measure has a quarter note C5. The lyrics "1. Me - lisma \_ Me - lisma \_ Me - lisma \_ Me - lisma \_" are written below the staff, with hyphens under "Me" and "lisma".

Each note of a chord can have some lyrics attached. In this case, each note of the chord has lyrics of the form "Lyrics [123]" attached, where each lyrics has a different number attribute to distinguish them. These syllables should be imported into three different stanzas and the timing should be correct.



61i-Lyrics-Chords.xml



1. Lyrics 1  
2.  
3.

Multiple lyrics syllables assigned to a single note are implemented either using a space in the lyrics or by using the <elision> lyrics element. This testcase checks both of them. First, a note with one syllable is given, then a note with two syllables separated by a space and finally a note with two and one with three syllables implemented using <elision> is given.

61j-Lyrics-Elisions.xml



1. a b c d e f g h

Lyrics spanners: continued syllables and extenders, possibly spanning multiple notes. The intermediate notes do not have any <lyric> element.

61k-Lyrics-SpannersExtenders.xml




1. A \_ b - CC \_ e \_

## 71 ... Guitar notation

A normal staff with several (complex) chord names displayed.

71a-Chordnames.xml

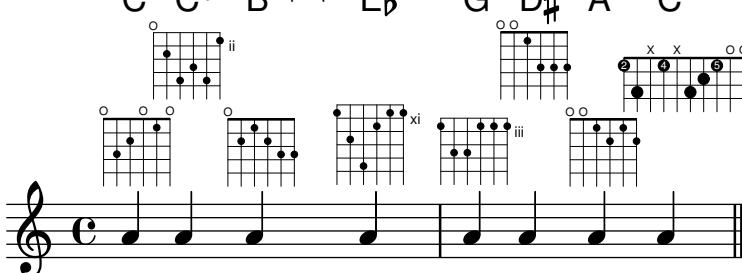
C<sup>5</sup> C<sup>lyd</sup> B<sup>7 #5 #9</sup> E<sub>b</sub><sup>sus2</sup> G<sup>5</sup> D<sup>#</sup><sub>Δ</sub> A<sup>o7</sup> A<sup>#5</sup>



A staff with chord names and some fretboards shown. The fretboards can have an arbitrary number of frets/strings, can start at an arbitrary fret and can even contain fingering information.

71c-ChordsFrets.xml

C<sup>5</sup> C<sup>lyd</sup> B<sup>7 #5 #9</sup> E<sub>b</sub><sup>sus2</sup> G<sup>5</sup> D<sup>#</sup><sub>Δ</sub> A<sup>o7</sup> C<sup>5</sup>



Chords and fretboards assigned to the voices in a multi-voice, multi-staff part. There should be fret diagrams above each of the two staves.

71d-ChordsFrets-Multistaff.xml

The image shows a musical score for a multi-staff part. At the top, there are four chord names: C<sup>5</sup>, D<sup>7</sup>, E<sub>b</sub>m<sup>9</sup>, and Cm<sup>7 11</sup>. Below these are four fretboard diagrams. The first diagram is for E<sub>b</sub>m<sup>9</sup> and is labeled with 'iv' and 'x'. The second diagram is for C<sup>5</sup> and is labeled with 'o o o'. The third and fourth diagrams are for D<sup>7</sup> and Cm<sup>7 11</sup> respectively, both labeled with 'o'. Below the diagrams are two staves of music: a treble clef staff and a bass clef staff, both in common time (C). The treble staff contains a melodic line with eighth notes, and the bass staff contains a bass line with eighth notes.

Some tablature staves, with explicit fingering information and different string tunings given in the MusicXML file.

71e-TabStaves.xml

The image shows a musical score with tablature for various instruments. The instruments listed on the left are Guitar, Bass Guitar, Banjo, Lute, and Ukulele. Each instrument has two staves labeled 'A' and 'B'. The tablature consists of numbers on a six-line staff, representing fret numbers. The first measure of the score is divided into two parts by a vertical line. The second measure is divided into two parts by a vertical line. The tablature for each instrument is as follows:

Instrument	Staff	Measure 1	Measure 2
Guitar	A	17 1	0 1
	B	5 2	4 5
Guitar	A	4 1	0 5
	B	3	4 2
Guitar	A	1 2	5 0
	B	2	0 6
Guitar	A	4	0 0 0
	B	5 0	0 0
Bass Guitar	A	0 0 8	0 0 0 0
	B	0	0 0 0 0
Banjo	A	3 0	0 0 0 0
	B	0	0 0 0
Lute	A	2 4 7	0 0 0
	B	1	0 0
Ukulele	A	4 0 0	0 0 0 0
	B	24 0	0 0 0 0

All chord types defined in MusicXML. The staff will only contain one c' note (NO chord) for all of them, but the chord names should be properly printed.

71f-AllChordTypes.xml

## All MusicXML chord names/types with <root>

1. major      minor      augmented      diminished

2. dominant      major-seventh      minor-seventh      diminished-seventh

3. augmented-seventh      half-diminished      major-minor      major-sixth

4. minor-sixth      dominant-ninth      major-ninth      minor-ninth

5. dominant-11th      major-11th      minor-11th      dominant-13th

6. major-13th      minor-13th      suspended-second      suspended-fourth

7. Neapolitan      Italians      French      German      pedal      power      Tristan      other

9. Inversion      F $\flat$ /C G $\sharp$ /D $\sharp$       C $^5$       C $^{\flat 5}$       G $^{\text{sus}2}$   
 F $\flat$ /C G $\sharp$ /D $\sharp$       C      C-3+5 $\flat$

There can be multiple subsequent harmony elements, indicating a harmony change during a note

71g-MultipleChordnames.xml

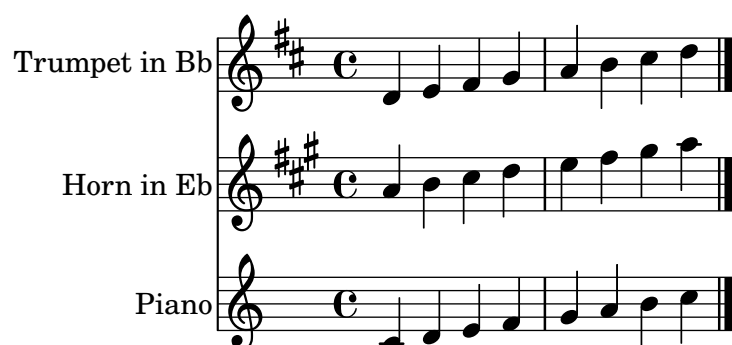


A musical staff in 4/4 time with a treble clef. The notes are C4, E4, G4, and B4. Above the staff, the chord names C<sup>5</sup>, F#m<sup>6</sup>, Dm<sup>7</sup>, and G<sup>7</sup> are written above the notes C, E, G, and B respectively.

## 72 ... Transposing instruments

Transposing instruments: Trumpet in Bb, Horn in Eb, Piano; All of them show the C major scale (the trumpet with 2 sharp, the horn with 3 sharp).

72a-TransposingInstruments.xml



Three staves of musical notation. The top staff is labeled 'Trumpet in Bb' and has a key signature of two sharps (F# and C#). The middle staff is labeled 'Horn in Eb' and has a key signature of three sharps (F#, C#, and G#). The bottom staff is labeled 'Piano' and has a key signature of no sharps or flats. All three staves show the C major scale (C, D, E, F, G, A, B) in a single measure.

Various transposition. Each part plays a c'', just displayed in different display pitches. The second-to-last staff uses a transposition where the displayed c' is an actual f'' concert pitch. The final staff is an untransposed instrument.

72b-TransposingInstruments-Full.xml

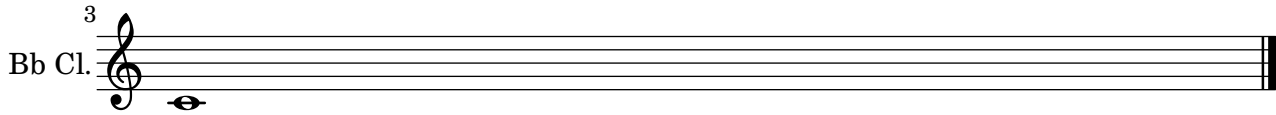
The image shows a musical score for ten different instruments, each on a separate staff. The instruments and their key signatures are: Clarinet in Eb (three sharps), Clarinet in Bb (two sharps), Clarinet in A (one flat), Horn in F (two sharps), Horn in Eb (three sharps), Piccolo Trumpet in A (one flat), Trumpet in Bb (two sharps), Trumpet in C (one sharp), Trumpet in D (one flat), and a staff labeled 'displayed c'=fis''' with a key signature of five sharps. Each staff contains a single note on a whole rest, followed by a double bar line.

An instrument change from one transposition (Clarinet in Eb) to another transposing instrument (Clarinet in Bb). The displayed instrument name should also be updated.

The whole piece is in Bb major (sounding), so first the key signature should be one flat, after the change it should have no accidentals.

72c-TransposingInstruments-Change.xml

The image shows a musical score for a Clarinet in Eb. The staff starts with a key signature of one sharp (F#) and a common time signature (C). The first measure contains a whole note on the second line (F#). A double bar line follows. The second measure contains a whole note on the second line (F), indicating a change to no sharps or flats.



### 73 ... Percussion

Three types of percussion staves: A five-line staff with bass clef for Timpani, a five-line staff with percussion clef, and a one-line percussion staff with only unpitched notes.

73a-Percussion.xml



### 74 ... Figured bass

Some figured bass containing altered figures, bracketed figures and slashed figures. The last note contains an empty <figured-bass> element, which is invalid MusicXML, to check how well applications cope with malformed files.

Note that this file does not contain any extenders!

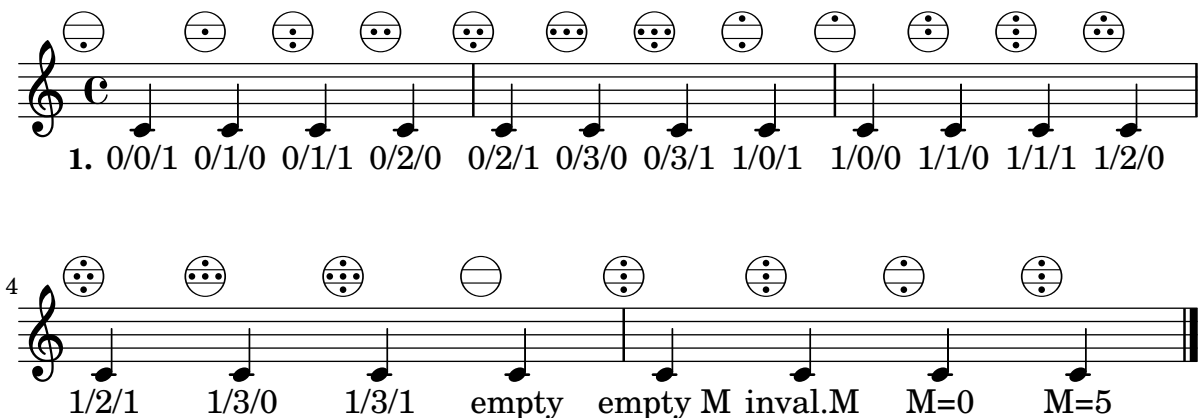
74a-FiguredBass.xml



### 75 ... Other instrumental notation

All possible accordion registrations.

75a-AccordionRegistrations.xml



## 90 ... Compressed MusicXML files

A compressed MusicXML file, containing a simple MusicXML score and the corresponding .pdf output for reference.

90a-Compressed-MusicXML.mxl

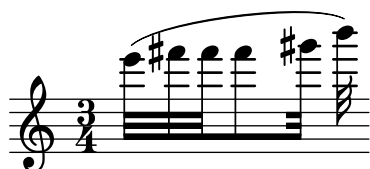
### Compressed MusicXML file



## 99 ... Compatibility with broken MusicXML

Dolet 3 for Sibelius (5.1) did not print out any closing beam tags, only starting and continuing beam tags. For such files, one either needs to ignore all beaming information or close all beams

99a-Sibelius5-IgnoreBeaming.xml



If we properly ignore all beaming information from the Dolet 3 for Sibelius export file, make sure that the lyrics syllables are still assigned to the correct notes.

99b-Lyrics-BeamsMelismata-IgnoreBeams.xml



1. Me - lisma \_\_\_ Me - lisma \_\_\_ Me - lisma \_\_\_ Me - lisma \_\_\_

A musical staff in C major and common time. The melody consists of a quarter note G4, followed by quarter notes A4, B4, C5, and B4. The lyrics '1. Me - lisma \_\_\_ Me - lisma \_\_\_ Me - lisma \_\_\_ Me - lisma \_\_\_' are written below the staff, with each syllable aligned under a note. The staff ends with a double bar line.